COST OF PRODUCTION AND PRICE

INTERESTING questions of theory are raised by Dr. Taussig's article on price-fixing. What are the economic forces that determine long-run or normal price ? At one time economists were content to say that it was the cost of production. When it was discovered that there were many costs of production, the question arose, which ? The question had already been answered in the case of commodities subject to the law of diminishing returns that it was the highest or marginal cost. President Walker then attempted to extend the same doctrine to all commodities with his well-known theory of the "marginal entrepreneur" and "rent of ability." There were different degrees of fertility in gray matter as well as in land. In this theory the normal price is clearly the cost of production to the least efficient entrepreneur, whom the increasing demand for the product calls into being.

Recent economists, while adhering to the doctrine of marginal cost as a price-determinant in the case of commodities subject to the law of diminishing returns, have been disposed to accept Marshall's theory of the representative firm in the case of commodities subject to the law of constant or decreasing cost. It is not towards the cost of production to the least efficient producer that price gravitates, they say, but to that of the well-established, solid business man — the man doing a conservative, prosperous, but not phenomenally brilliant business. The latter, the great "captain of industry" may be conceded, even in Marshall's theory, to reap a rent of ability. The high-cost producers, those whose costs are greater than that of the representative firm, are not tending to establish normal price, they are tending to effect their own elimination. Every year a sheaf of failures is thrown off, but every year a new sheaf of failures appears. The individuals change, the class is constant.

It may be remarked as a comment on this theory that a single year is too short a period to determine which of the

competing firms is the representative firm whose cost determines normal price. Accident, a poor season, the newness of the business bring it about that every year some of the competitors produce at a cost higher than the price, and hence are doing business at a loss, who nevertheless in the long run are doing a profitable business. Such will ordinarily be the history of the hypothetical representative firm itself. Good years will offset bad years. However, making allowance for such vicissitudes and taking long-time averages, Marshall's theory appears to be more in harmony with facts. It is not the highest-cost firm nor yet the lowest-cost firm that determines normal prices, it is a firm somewhere intermediate between them.

But, after all, Marshall's theory is supplementary rather than antagonistic to Walker's. President Walker was applying economic reasoning to a human society much as a mathematician applies the principles of applied mechanics to the construction of a bridge. He works out his strain sheet as tho all the struts and ties were mathematical lines, as tho they were uniform in texture throughout, as tho they met at geometrical points. He knows as well as the practical bridge builder that not one of these conditions is realized in fact. Yet his strain sheet is none the less valuable and, even after allowing an adequate coefficient of safety, results in great saving of material. So Walker for the purposes of theory assumed a standardization, a fluidity in the action of economic forces operating in a human society which he would probably have been the first to admit is not to be realized in fact. The moment the supply of commodities which the most efficient entrepreneur is able to turn out is insufficient to meet the demand, and a rise of price follows, he supposes another entrepreneur to step in of precisely the right degree of mediocre ability just barely to reimburse himself at the slightly advanced price.

Now what Walker assumed in regard to different grades of entrepreneurs is precisely what Ricardians assume in regard to land. They also are presenting for the purposes of theoretical reasoning hypothetical conditions which they know well

enough can never be more than roughly approximated in actual life. There will always be a fringe of land that is worked at a loss. The cost of production that determines or, better, equals normal price is never the marginal in the sense of highest cost of production. A certain number of producers will always be found occupying land which is as yet of too low a grade to reimburse them at the current price of the product. Even if land could be conceded to be taken up step by step in infinitesimal gradations, the human factor cannot be omitted. Even then it would be the representative firm operating marginal land that would produce at the price-determining cost. The business genius or the business weakling operating marginal land would produce at a cost, the one less, and the other more than the normal price. In short the two theories are seen to be in fact the same theory, except that in one an attempt is made to adjust reasoning, applicable to an hypothetical society, to an actual society. Walker's marginal entrepreneur operating in a conceptual society becomes Marshall's representative firm operating in an actual society.

But when this is admitted we seem at once to make the whole theory valueless for any practical application. So long as we could conceive ourselves to be working in a society, shall I say, geometrically perfect, we had only to collect from all firms statistics as to their costs of production, tabulate the costs in order, and then note which was the highest, in order to determine the normal price. But if the marginal cost or the representative firm cost is not the highest, which one is it? We are driven, perforce, to reverse the process, to determine by averaging price data what is the normal price, find which of the costs is equal to it and call that cost the marginal or representative firm cost. That is, we make normal price determine marginal cost. Having done this, to go on and say that it is marginal cost which determines normal price is to reason in a circle. In truth, neither does marginal cost determine price, nor does price determine marginal cost. Both are results of a more primitive underlying force. That efficient force is human want measuring itself against resistance, whether the resistance be the limitations of nature or human

nature, land or brain. Under the impulse of this underlying force, as human want, manifesting itself in demand, presses against land and brain limitations there result a price and a series of costs, tangible evidences and measures of both want and resistance. Among these costs one will be found equal to the price, and so long as the conditions of want and resistance remain the same that cost and price remain the same. The price, so determined, may be called "normal." Whether we call the cost "marginal" or "representative" is a matter of terminology. In the cost curves so far examined it is found to be near the right hand extremity, indicating that by far the greater portion of the output is produced at a cost equal to or less than that cost. For it, therefore, the term "marginal" is objectionable in that it is too uncompromising; it suggests the absolute last term of the series, the highest cost. "Representative" is objectionable in that it is too compromising; it somehow suggests an average or modal cost, whereas, as just stated, it is ordinarily very near the end of the series. Provisionally, however, and subject to the above explanation, the term "marginal" will be employed in this paper when referring to the cost which is equal to the normal price.

The above analysis is not inconsistent, as might appear at first blush, with the doctrines of constant and decreasing cost. It is merely necessary that they be modified to adapt themselves to an actual society instead of the mentally fabricated society with reference to which they are ordinarily discussed. "Constant cost" implies, that however much the output be increased the price-determining cost will be neither increased nor diminished. It is usually represented by a straight horizontal line, thus adding to the concept of constant cost another concept, unnecessary even for the fictitious society of the economist, that it is also uniform. Even in such a society, if the theory of the "rent of ability" be admitted, it should be an ascending line, with the proviso that as demand increases it should always ascend to the same level at the point where it meets the demand curves, thus:

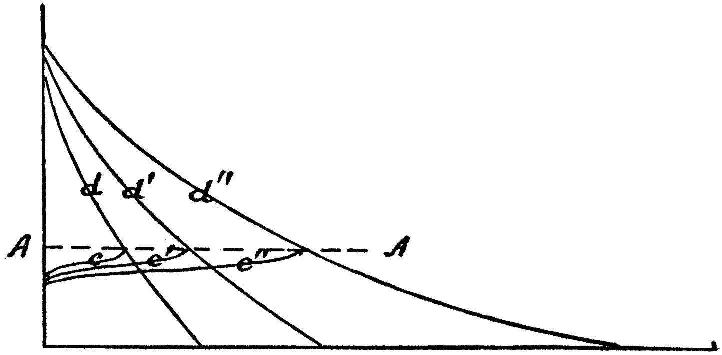

FIGURE 1.

The only difference for an actual society would be that it would cross the demand curves always at the same level, but would extend a short distance beyond them to allow for firms producing at a loss, thus:

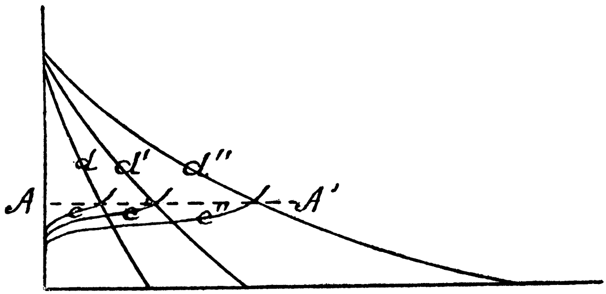

FIGURE 2.

In the case of decreasing cost there would be a series of cost curves crossing the successive demand curves at progressively lower levels as the demand increased, thus:

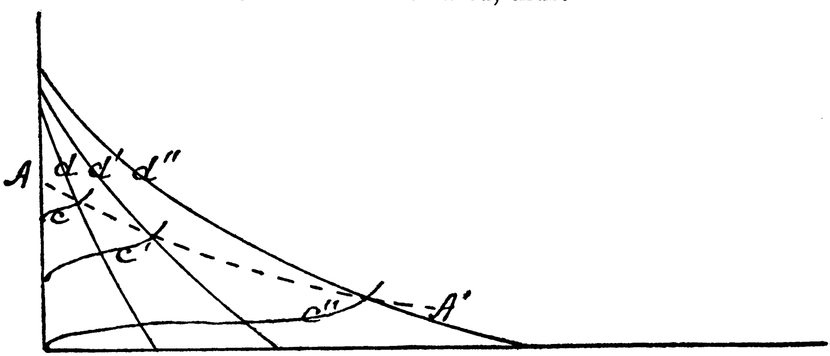

FIGURE 3.

In all the above diagrams, d, d′, d″ are demand curves; c, c′, c″ are cost curves. AA′ shows the levels at which the cost curves meet or cross the demand curves as demand increases, in Figs. 1 and 2 under conditions of constant cost, in Fig. 3 under conditions of decreasing cost.

It was stated that when we so amend the marginal cost theory as to make the marginal cost no longer the highest cost but an intermediate cost, we seem to have rendered the whole theory valueless for practical purposes as a means of determing normal price. Now it is sometimes desirable to determine normal price independently of market price, especially when the latter differs widely from it, as it may in time of war or financial panic. It is also desirable to ascertain normal price when the problem of government regulation of prices calls for solution. In such cases the difficulty referred to may be met by applying the following method.

On the principle of statistical constancy it would seem to be a legitimate assumption, in the case of a large and well-established industry, that, in normal times, about the same percentage of the entire output will be produced at a loss. Having ascertained from cost and price data, collected preferably by a government agency through a series of years, what this percentage is, we can, for the year under study, subtract this percentage from the total output and note what is the highest cost among the costs at which the remaining portion of the output is produced. This cost we may call the marginal cost and consider the normal price as being equal to it.

For example, in a certain region where a considerable portion of the United States supply of sugar is produced, it would appear from pre-war statistics that in normal times about 3 per cent of the output is annually produced at a loss. In the year 1916–17 when an abnormal relation between supply and demand had been brought about by the war, but before government regulation of prices had been attempted, it was found that 97 per cent of the output was produced at a cost not greater than $92.00 per ton, which may accordingly be regarded as the marginal cost or normal price for that year.

The actual price was $124.56 or $32.56 above normal. In the following year, 1917–18, when the price had been regulated by voluntary agreement with the United States Food Administration, the normal price, computed by the same method, would have been $147.00. The actual price was $120.00, or $27.00 below normal.

In connection with the above analysis the writer wishes to emphasize the importance of statistical inquiry as a means of checking and extending economic theory. From the examination of a considerable number of cost curves similar to those shown in Dr. Taussig's article, he was struck with the remarkable family resemblance, whether they were derived from industries to which the law of diminishing returns would presumably apply or not. In all of them there was the same ascending ogee curve, sometimes steep, sometimes more nearly horizontal, but always a curve of the same family type, and in all cases, where the data were at all complete, crossed by the average-price line near its right hand extremity. This unexpected result led him to question whether competition, in the case of industries not subject to the law of diminishing returns, tended to result in a uniform cost for all producers to nearly so great an extent as had been generally supposed, and further led him to question whether there might not be more truth in Walker's theory of marginal and infra-marginal entrepreneurs than recent economists had been willing to admit. Further reflection made it clear that there was no real difference between Walker's theory of the marginal entrepreneur and Marshall's theory of the representative firm. Finally a promising method of handling statistics so as to determine marginal cost and normal price was developed as a result of such theorizing.

It is not the purpose of this article to assert that such cost lines as have been described will be found to exist for all industries. Some industries may be found for which the cost lines are horizontal or approximately horizontal, and in that case it would be interesting to investigate and compare with a view

to determining what are the factors which result in horizontal cost lines for some industries and ascending cost lines for others. Such an investigation would undoubtedly result in a further development and clarification of theory.

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AN EMINENT ECONOMIST CONFUSED

THE writer of this note has recently had called to his attention Professor Carver's new and interesting *Principles of Political Economy*. With much that is unusually clear and convincing, it is regrettable to find a vaguely stated and doubtfully valid argument that a protective tariff may add to a nation's wealth by drawing labor out of a line which its employers deem more profitable (under free trade) into one which yields its employers less. Professor Carver's argument, in its most concrete statement, is as follows:[1] "Let us suppose that a certain tract of land had been devoted to cultivation of a fairly intensive kind, and had been producing enough to pay the wages of twenty laborers, with something left over for rent. Through some change of circumstance the price of wool rises, and it is found more profitable to use the land for wool-growing. By turning the land into a sheep run, nineteen of the laborers may be dispensed with, and the saving in wages would more than measure the difference between the value of the wool crop and that of the present crop, so that a larger surplus would be left over as rent. There is little doubt that the land would then be devoted to the growing of wool. That would be to the interest of the landlord and against the interests of the nineteen laborers, but the landlord is in a better position than they to determine the form of cultivation. There is also little doubt that this would be contrary to the interest of the community. Less would be pro-

[1] Principles of Political Economy, p. 360.